FINAL

Addendum 04

Smoky Canyon Mine
Remedial Investigation/Feasibility Study
Sampling and Analysis Plan

November 2012

Focused Shallow Groundwater Sampling in Northern Sage Valley

Additional Sediment Sampling in Pole Canyon Creek Channel in Northern Sage Valley

Focused Soil Sampling in Northern Sage Valley

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1.0 FOCUSED SHALLOW GROUNDWATER SAMPLING IN NORTHERN SAGE VALLEY

Sample collection of shallow groundwater in northern Sage Valley is planned for the fall of 2012. Sampling will be focused in the area where elevated selenium concentrations were observed in soil and vegetation in northern Sage Valley. This focus area is located approximately 2,000 feet southeast of alluvial groundwater monitoring well GW-22 (Figure 1) within an area that is occasionally wet into the summer months, suggesting a potential influence of shallow groundwater on surface media in this area. The estimated photo-identified location of the occasionally wet area is shown on Figure 2. Shallow groundwater samples will be collected once during the fall of 2012 and again during the spring of 2013. Actual sampling dates will depend on favorable weather conditions. Sample collection is planned at a total of three locations, as described below and shown in Figure 3.

1.1 Sampling Objective

The objective for sampling shallow groundwater in northern Sage Valley is to provide data for characterization of selenium concentrations in shallow groundwater in the area where elevated selenium concentrations were observed in soil and vegetation, relative to other samples collected in northern Sage Valley. This investigation is designed to determine if selenium concentrations in the local shallow groundwater may have contributed to the elevated selenium concentrations in soil and vegetation.

Results from the shallow groundwater sampling will be compared with selenium concentration data from previous upgradient shallow groundwater sampling in northern Sage Valley at GW-22, which has shown elevated concentrations of selenium (see Figure 4). If selenium concentrations in the local shallow groundwater samples are similar to those for samples previously collected at GW-22, then the discharge of shallow groundwater can be viewed as an important source of elevated selenium concentrations in soil and vegetation in the focus area. If selenium concentrations in shallow groundwater in this area are not similar to previous results for alluvial groundwater in the area, then the wet area may be influenced by other selenium sources which may include contact of Pole Canyon Creek flow with soil and vegetation in the area, sediment deposition from upstream sources (i.e., the Pole Canyon ODA), and historical placement of salt licks in the area.

1.2 Background Information

The Pole Canyon ODA is the source of selenium contamination for shallow groundwater in Sage Valley. However, the wide range in selenium concentrations in shallow groundwater sampled across northern Sage Valley indicates a spatially varied influence of the upgradient ODA, with lower concentrations observed in samples collected farther downgradient from the ODA.

Alluvial groundwater has been characterized based on data collected since 2003-2004 at monitoring wells GW-22 and GW-19b, which are located 2,000 feet to the northwest/upgradient and one mile to the southeast/downgradient of the focus area (i.e., occasionally wet area), respectively (Figure 1). Also, in 2004 and again in 2010, upper Sage Valley was visually surveyed to identify any potential locations of alluvial groundwater discharge to the surface. Areas where non-irrigation surface water was observed were considered locations of potential alluvial groundwater discharge, and the water present was sampled.

Shallow groundwater sampled at GW-22 exhibits selenium at concentrations that appear to result from transport from the ODA. The occasionally wet area, located approximately 2,000 feet southeast of and downgradient from GW-22, has existed on a long-term basis in northern Sage Valley, suggesting an historical effect of shallow groundwater in this area. A time-series plot of selenium concentration data for GW-22 is shown in Figure 4. Over the past several years, selenium concentrations at GW-22 have ranged from less than 0.01 to 0.23 mg/L at the 90-foot depth and 0.01 to 0.07 mg/L at the 150-foot depth. However, selenium concentrations at GW-19b, which is located approximately one mile downgradient from the focus area, have remained below 0.003 mg/L (Figure 4), with only two instances since 2004 of concentrations exceeding 0.003 mg/L. The lower concentrations at GW-19b indicate a decreased influence from the Pole Canyon ODA on shallow groundwater quality in areas south of and downgradient from the focus area and GW-22.

Data to characterize alluvial discharges in Sage Valley were collected during 2004 and 2010 sampling activities. The 2004 data were presented in the 2005 Site Investigation (SI) Report (NewFields, 2005), and data collected in 2010 were presented in the 2010 Data Summary Report (DSR) (Formation, 2011). The six locations sampled in 2004 were revisited in 2010, but water was observed at only one of the six locations (SVP-1) (Figures 1 and 2). Although a sample was collected from that location in 2010, the area was determined by observation to be a pond fed by irrigation water instead of alluvial discharge. In 2010, an additional sample was collected at a new alluvial discharge location (SVP-4) in the southern portion of Sage Valley (Figures 1 and 2). The selenium concentrations in these two samples were 0.0004 and 0.0005 mg/L, indicating a lack of impact from the Pole Canyon ODA.

The low-lying occasionally wet area located approximately 2,000 feet downgradient from GW-22 appears to convey Pole Canyon Creek surface flow during high-flow periods, although a defined channel is not present in portions of this area. This area remains wet into the summer even when there is no incoming surface flow from the Pole Canyon Creek channel, thus potentially indicating discharge of shallow groundwater. The area may also be influenced by irrigation in Sage Valley.

Compared with other soil and vegetation samples collected throughout northern Sage Valley, selenium concentrations were elevated in samples collected at LPSV-13 and SV-13. These elevated concentrations may result from discharge of shallow groundwater in this area.

Collection of shallow groundwater samples in the vicinity of LPSV-13/SV-13, within the occasionally wet area (focus area), will provide information needed to assess potential impacts from selenium concentrations in shallow groundwater.

1.3 Sampling Locations and Procedures

Shallow groundwater samples will be collected in the focus area to determine whether selenium concentrations in surface soils may be impacted by shallow groundwater in this area. A total of three locations will be sampled (Figure 3) in the occasionally wet area. These locations will be near the two locations of elevated selenium concentrations in surface soils in northern Sage Valley:

- One location (MP01) in the vicinity of LPSV-13,
- One location (MP02) in the eastern portion of the occasionally wet area, southeast of MP01 and northeast of MP03, and
- One location (MP03) in the vicinity of SV-13.

The final locations will be determined in the field based on accessibility and representativeness of areas potentially affected by shallow groundwater (e.g., near willows or other vegetation indicating occasionally wet conditions). The actual sample locations will be recorded during sampling using a GPS unit.

Based on groundwater and surface water elevation data in northern Sage Valley and observations of the occasionally wet conditions in the area of interest that suggest possible discharge of shallow groundwater, the depth to groundwater is expected to be close to the ground surface. This was recently confirmed by driving a test probe at location LPSV-13, which showed depth to groundwater of 9.8 feet on September 20, 2012. Therefore, to obtain samples and water levels of the shallow groundwater at this depth (more or less) in the area, piezometers will be used. The piezometers will be installed manually using a fence-post driver or by pre-drilling a small diameter boring, using a soil auger, prior to driving the piezometer. If no large rocks are encountered this method is capable of reaching depths of up to 24 feet. All piezometers will be temporarily completed with a 1-inch PVC pipe with a 2- to 10-ft screen section starting at the bottom of the boring. The top of the pipe will be capped at approximately two feet above the ground surface, and T-post/barbed wire fencing will be installed individually around each piezometer to provide protection from cattle. After the spring 2013 sampling event, if any of the piezometers should remain for a longer time, then a more permanent form of protection (i.e., metal casing) will be installed.

Groundwater sampling procedures for alluvial groundwater specified in Section 3.2.3.1 of the Final RI/FS SAP (Formation, 2010) will be followed during this sampling event. The methods for sampling are described in detail in JRS SOP No. 4, Groundwater Sampling and Water Level

Measurements at Monitoring Wells and Piezometers (FSP Attachment). Field parameters will be measured and recorded during sample collection. Field parameter measurement and calibration protocols are detailed in JRS SOP No. 5 (Water Quality Sampling), MFG SOP No. 17 (Field Measurement of Dissolved Oxygen), and MFG SOP No. 13 (Field Measurement of Oxidation-Reduction Potential) (FSP Attachment). Field duplicates will be collected as required by the RI/FS QAPP (Formation, 2010).

While collecting shallow groundwater samples in the spring of 2013, portions of the occasionally wet area receiving irrigation water will be identified along with the source(s) of this water. These observations, along with information obtained during sampling, will be used to assess the extent to which irrigation water may influence conditions in the wet area.

1.4 Sample Analysis

The groundwater samples will be analyzed for total and dissolved selenium, sulfate, alkalinity, and total dissolved solids in accordance with the laboratory procedures and methods identified in SAP Table 3-2 (Formation, 2010) and the Quality Assurance Project Plan (QAPP). Sample identification and handling will follow procedures specified in Section 3 of the RI/FS SAP (Formation, 2010).

2.0 ADDITIONAL SEDIMENT SAMPLING IN POLE CANYON CREEK CHANNEL IN NORTHERN SAGE VALLEY

Sediment sampling is planned for the fall of 2012 to provide additional selenium concentration data in the Pole Canyon Creek channel. The new sediment sampling locations will cover the extent from the location of previous lower Pole Canyon sediment sample collection to, and just beyond, the occasionally wet area (focus area) in northern Sage Valley, as described above. Sample collection is planned at a total of five locations, as described below and shown in Figure 3.

2.1 Sampling Objective

The objective of the additional sediment sampling in the Pole Canyon Creek channel is to provide selenium concentration data to further characterize changes in selenium concentrations with distance downstream from Pole Canyon in northern Sage Valley. Sediment sampling will also provide data for delineating the extent to which stream sediments are impacted downgradient from the focus area. Sediment samples will be collected at three locations between previous sediment location LPT5 and the occasionally wet area (LPSV-13/SV-13), and also at an additional two locations downgradient from the occasionally wet area where streamflow is channelized (Figure 3).

Results from analyses of the additional sediment samples will supplement data from sediment samples collected as part of the RI in 2010 and 2011 (Figure 1). Selenium concentrations for the newly collected sediment samples will be compared with results from previously sampled locations to identify the extent of transport from the Pole Canyon ODA to downstream sediments. Selenium concentration data will also be compared with the screening-level benchmark concentration of 2 mg/Kg for sediment (see 2011 DSR [Formation, 2012]).

2.2 Background Information

Sediment samples were collected in lower Pole Canyon in 2010 and 2011 (Figure 1) to assess effects of overburden materials that were deposited in this area during past slope failures at the toe of the ODA, although the toe of the ODA has since remained stable. Two of the 2011 sample locations (LPT4 and LPT5) were downstream from locations sampled in 2010 to further characterize the downstream distribution of selenium in sediment.

The highest selenium concentrations for the sediment samples were measured closest to the ODA toe and generally decreased with distance downgradient. Selenium concentrations at the two downstream, in-channel locations (LPT4 and LPT5) were similar to the immediately upgradient in-channel (LPT3-2) results, and they were above the sediment screening level of 2 mg/Kg. The selenium concentrations at the most downgradient location sampled (7.2 and 5.3 mg/Kg for the 0- to 4-inch and 6- to 12-inch depths, respectively, at LPT5) were at the same order-of-magnitude but higher than the screening level which is provided only for comparison.

The selenium concentrations at LPT5 are lower than for locations upstream of LPT5 closer to the ODA. However, the selenium concentrations at LPT5 are above the screening level, indicating a need for additional characterization of selenium in stream sediment downgradient from LPT5.

Collection of additional sediment samples in the Pole Canyon Creek channel downstream from LPT5 will provide information needed to further define selenium concentration changes with distance downstream from the Pole Canyon ODA. Also, sediment samples collected immediately downgradient from the occasionally wet area where streamflow is channelized will provide information needed to further delineate the extent of elevated selenium concentrations associated with the focus area.

2.3 Sampling Locations and Procedures

Sediment sample collection in the Pole Canyon Creek channel in northern Sage Valley will follow the previously approved protocols provided in the Final RI/FS Sampling and Analysis Plan (SAP) (Formation, 2010), including the Quality Assurance Project Plan (QAPP) along with Field Sampling Plan (FSP) Sections 3.4.2.3 (Equipment and Procedures), 3.4.4 (Sediment Sample Design), and 3.4.5 (Sampling Handling and Analysis).

Samples will be collected from the same two depths (0 to 4 inches and 6 to 12 inches) as for sediment samples collected in lower Pole Canyon in 2010 and 2011. Samples will be collected as five-point composites in accordance with SOP No. 14 (Sediment Sampling for Chemical Analysis). Two samples will be collected at each new sampling location, from the 0- to 4-inch and 6- to 12-inch depths, and will be obtained by scraping the side of the hand-dug 12-inch-deep excavation using a disposable scoop or trowel to obtain depth-integrated samples. Field duplicates will be collected as required by the RI/FS QAPP (Formation, 2010).

A total of five additional channel locations will be sampled (Figure 3). Three of these locations will be between LPT5 and the occasionally wet area at a spacing of approximately 1,300 feet. Two other channel locations will be sampled downstream from the occasionally wet area where streamflow is channelized; one of these locations will be immediately downstream from the wet area and the second location will be farther downstream in the creek channel before reaching the North Fork of Sage Creek.

The actual sample locations will be recorded during sampling using a GPS unit.

2.4 Sample Analysis

The sediment samples will be analyzed for selenium in accordance with the laboratory procedures and methods identified in SAP Table 3-7 (Formation, 2010) and the Quality Assurance Project Plan (QAPP). According to sample analysis protocols (Formation, 2010),

prior to laboratory analysis the samples will be sieved to less than 2 mm. Sample identification and handling will follow procedures specified in Section 3 of the RI/FS SAP (Formation, 2010).

3.0 FOCUSED SOIL SAMPLING IN NORTHERN SAGE VALLEY

Collection of additional soil samples in northern Sage Valley is planned for the fall of 2012. Sampling will be focused in the area surrounding previous soil and vegetation sample locations LPSV-13 and SV-13 where elevated selenium concentrations were observed, and will provide data for further characterization of the extent of selenium concentrations in this area. This focus area is located approximately 2,000 feet southeast of alluvial groundwater monitoring well GW-22 (Figure 1). Sample collection is planned at a total of 14 locations, as described below and shown in Figure 3.

3.1 Sampling Objective

The objective of the additional soil sampling in northern Sage Valley is to provide selenium concentration data to further characterize the extent of elevated selenium concentrations in soils in the area surrounding previous sample locations LPSV-13 and SV-13. Transects will be established to intersect this area, and will extend beyond the wet area. Multiple samples will be collected along each transect. This investigation is designed to determine the extent of elevated selenium concentrations in soils associated with the focus area.

Results from the soil sampling will be compared with selenium concentration data from previous soil sampling throughout northern Sage Valley (see locations on Figure 1). Samples with selenium concentrations similar to those previously measured at LPSV-13 and SV-13 will further define the extent of the area with elevated selenium concentrations, whereas, soils with selenium concentrations similar to those measured throughout the rest of northern Sage Valley will indicate locations outside of the extent of the area with elevated selenium concentrations.

3.2 Background Information

Soil and vegetation samples were collected in northern Sage Valley during 2004 SI sampling and also during 2010 and 2011 RI sampling. A review of selenium data from these previous sample collection activities shows the highest selenium concentrations for soil in northern Sage Valley were measured during the SI (2004) and RI (2011) at two locations (SV-13 and LPSV-13) approximately 2,000 feet southeast of GW-22. These two locations represent a portion of the focus area, but no additional soil samples were collected in the immediate vicinity (Figures 1 and 2). Selenium concentrations in soils at these two locations were 10.5 and 41.1 mg/kg, respectively. Selenium concentrations for soil samples collected throughout the rest of northern Sage Valley during the RI in 2010 and 2011 were typically lower than or similar to selenium concentrations measured during the SI.

Previously sampled soils on all sides of LPSV-13 and SV-13 have selenium concentrations generally one or two orders-of-magnitude lower than those measured at these two locations (Figure 1). These data, along with delineation of the approximate location of the occasionally wet area (Figure 2), indicate that elevated selenium concentrations in the vicinity of LPSV-13/SV-13 may extend across an area of up to approximately 1,200 feet by approximately 500

feet (extending on both sides of the general creek flow area). Collection of additional soil samples in the vicinity of LPSV-13/SV-13, and extending beyond this area, will provide information needed to further delineate the extent of elevated selenium concentrations in this area.

3.3 Sampling Locations and Procedures

Soil samples will be collected at a total of 14 locations (Figure 3), extending on three transects that intersect the area represented by the previous LPSV-13/SV-13 sampling locations. The final locations will be determined in the field based on accessibility and representativeness of soils in the area associated with LPSV-13 and SV-13 and the surrounding area. Sample locations on each transect will extend away from the LPSV-13/SV-13 area to provide data defining the limits and extent of elevated selenium concentrations in this area. The actual sample locations will be recorded during sampling using a GPS unit.

Soil sampling procedures specified in the Final RI/FS SAP (Formation, 2010) will be followed during this sampling event. Soil samples will be collected from the 0- to 6-inch depth interval. The methods for sampling are described in detail in JRS SOP No. 27, Soil Sampling for Inorganic Compounds (FSP Attachment).

Each surface soil sampling location will be laid out to cover an area no larger than 10,000 square feet (100- by 100-foot grid) and will be subdivided into five subareas of approximately equal area. One subsample will be collected from the approximate center of each subarea. Equal volumes of subsample from each of the five subareas will be combined to yield one composite surface soil sample to represent the average soil condition within the sampling location.

To create each composite, soil samples will be collected from the sampling location using a clean trowel and then combined and homogenized prior to analysis. The material from the five subsamples will be combined during sampling in a sealable, watertight, plastic bag or plastic bottle. Once all the subsamples have been collected, the sample will be homogenized in the field by manually mixing and massaging the materials within the sealed sample bag or turning and shaking the sample bottle for a minimum of 30 seconds. Any large vegetation debris, such as sticks or leaves, and gravel or cobbles may be removed using the sampling scoop or trowel, or a gloved hand. Once the sample has been composited, it will be immediately labeled, double-bagged, and stored in a covered container for shipment to the laboratory. Field duplicates will be collected from the mixed composite, as required by the RI/FS QAPP (Formation, 2010).

General soil descriptions will be recorded for the surface soils in each sampling location. Description of the soil texture and color, and presence of litter, roots, and rocks, will be recorded at the time of sampling.

3.4 Sample Analysis

The soil samples will be analyzed for selenium in accordance with the laboratory procedures and methods identified in SAP Table 3-7 (Formation, 2010) and the Quality Assurance Project Plan (QAPP). Sample identification and handling will follow procedures specified in Section 3 of the RI/FS SAP (Formation, 2010).

4.0 REFERENCES

Formation Environmental (Formation), 2010. Final RI/FS Sampling and Analysis Plan (SAP), including Quality Assurance Project Plan (QAPP), Field Sampling Plan (FSP), and Health and Safety Plan (HASP). Smoky Canyon Mine Remedial Investigation/Feasibility Study. Prepared for J.R. Simplot Company, June. Incorporates SAP Addendum 01 (May 2011), SAP Addendum 02 (August 2011), SAP Addendum 03 (October 2011).

Formation. 2011. Final 2010 Data Summary Report. Smoky Canyon Mine Remedial Investigation/Feasibility Study. Prepared for J.R. Simplot Company. October.

Formation. 2012. Revised Draft 2, 2011 Data Summary Report. Smoky Canyon Mine Remedial Investigation/Feasibility Study. Prepared for J.R. Simplot Company. October.

NewFields, 2005. Final Site Investigation Report, Smoky Canyon Mine, Caribou County, Idaho. Prepared for J.R. Simplot Company, July.

FIGURES

S:\GIS\ARCPRJ2\010109\PLT\TASK44\SAP_ADDENDUM04\FIG1_SL_VG_SAGEVALLEY.MXD

LPSV-08 (RI 2011)
0.15 GRS
0.12 FRB
0.12 SL

NSV-1

Unimpacted Location

See Detail A

See Detail B

LPSV-04 (RI 2011)
5.35 GRS
8.64 FRB
0.24 SL

LPSV-05 (RI 2011)
0.53 GRS
0.15 FRB
0.15 SL

LPSV-06 (RI 2011)
0.07 GRS
0.2 FRB
0.19 SL

LPSV-07 (RI 2011)
0.66 FRB
0.31 GRS
0.23 SL

Pole Canyon Creek Diversion

North Fork Sage Creek

LPSV-03 (RI 2011)
1.04 FRB

LP-1
GW-26
LP-PD
GW-15
GW-16
LPT5 (RI 2011)

Pole Canyon ODA

SV-28 (RI 2010)
0.41 VG
0.27 SL

SV-1A (SI)
0.28 VG
1.9 SL

SV-2 (SI)
0.18 VG
0.41 SL

SV-3 (SI)
0.16 VG
0.29 SL

LPSV-09 (RI 2011)
0.3 GRS
0.3 FRB
0.19 SL

SV-29 (RI 2010)
0.03 VG
0.24 SL

NSV-2
NSV-3
NSV-4

SV-30 (RI 2010)
0.03 VG
0.43 SL

SV-4 (SI)
0.25 VG
0.58 SL

GW-22

SV-5 (SI)
0.35 VG
0.43 SL

LPSV-12 (RI 2011)
14.7 FRB
17 GRS
0.45 SL

SV-6 (SI)
0.46 VG
0.4 SL

SV-7 (SI)
0.59 VG
0.29 SL

GW-24

SV-27 (RI 2010)
4.34 VG
0.47 SL

NSV-5

Pole Canyon Creek

SV-26 (RI 2010)
0.03 VG
0.29 SL

SV-8 (SI)
0.05 VG
0.23 SL

SV-9 (SI)
0.07 VG
0.31 SL

SV-10 (SI)
16.6 VG
0.56 SL

SV-11 (SI)
0.64 VG
0.35 SL

LPSV-10 (RI 2011)
0.11 GRS
0.65 FRB
0.27 SL

SV-25 (RI 2010)
0.03 VG
0.28 SL

LPSV-13 (RI 2011)
28.2 GRS
769 FRB
41.1 SL

Occasionally Wet Area (Focus Area)

SVP-1

SV-12 (SI)
0.08 VG
0.41 SL

SV-13 (SI)
30 VG
10.5 SL

SV-14 (SI)
2.27 VG
2.4 SL

SVS-1

SV-15 (SI)
0.08 VG
0.34 SL

SV-16 (SI)
0.05 VG
3.1 SL

SV-24 (RI 2010)
0.35 VG
0.4 SL

SV-17 (SI)
0.12 VG
0.24 SL

SV-23 (RI 2010)
0.2 VG
0.36 SL

SV-22 (RI 2010)
0.03 VG
0.31 SL

Ditch

SV-18 (SI)
0.11 VG
0.22 SL

SV-19 (SI)
0.39 VG
0.61 SL

SV-21 (RI 2010)
0.1 VG
1.2 SL

SV-20 (SI)
0.4 VG
0.22 SL

Detail A

LPSVT-5 (RI 2011)
0.15 GRS
0.15 FRB
0.13 SL

LPSVT-4 (RI 2011)
0.15 GRS
2.13 FRB
0.14 SL

LPSVT-3 (RI 2011)
3.01 GRS
7.91 FRB
0.26 SL

LPSVT-2 (RI 2011)
1.27 GRS
7.22 FRB
0.2 SL

LPSVT-1 (RI 2011)
0.3 GRS
0.46 FRB
0.19 SL

Detail B

LPSV-02 (RI 2011)
69.4 GRS
44 FRB
0.5 SL

LPT2-2 (RI 2010)
18 SD

LPT1-2 (RI 2010)
47.9 SD

LP (SI)
26.3 VG

LP-PD (RI 2010)
42 VG
0.56 SL

LPSV-1A (RI 2011)
44.2 GRS
121 FRB
30.8 SL

LPSV-01 (RI 2011)
71 GRS
153 FRB
52.6 SL

LP-PD (RI 2010)
13.4 SD

LPT3-2 (RI 2010)
9.3 SD

LPT4 (RI 2011)
10.5 SD
41.8 FRB
32.1 GRS
13.9 SL

LPSV-11 (RI 2011)

Note: See Figure 4-7 in 2011 Data Summary Report for locations and selenium concentrations in Lower Pole Canyon channel and overbank area sediment samples collected under the RI in 2010 and 2011.

Abbreviations:
VG = General Vegetation
SL = Soil
SD = Sediment
GRS = Grass
FRB = Forb
SI = Site Investigation (2004)
RI = Remedial Investigation (2010, 2011)
2011 = August 2011 Soil and Vegetation Sampling
AWRMP = Area-Wide Risk Management Plan

0 700 1,400 Feet

N

1600 ft to SVP-4

2100 ft to GW-19b

Selenium Concentration (mg/Kg) in Vegetation
< 5 AWRMP Removal Action Level for Plants
5 - 25
26 - 50
> 51

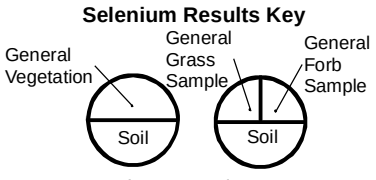
Selenium Concentration (mg/Kg) in Soil
< 0.63 Ecological Screening Benchmark
0.63 - 5.20 AWRMP Removal Action Level for Riparian/Fluvial Soils
5.21 - 39.0 Human Health Screening Benchmark
> 39.0

Surface Water Monitoring Location (includes Sage Valley Ponds)

Selenium Concentration (mg/Kg) in Stream Surface Sediment
(2004 SI and 2010 RI)
< 1
1 - 10
10 - 100
> 100

Alluvial Monitoring Well
Wells Formation Monitoring Well

Selenium Results Key



Note: Non-detect results are presented without the qualifiers. See Table 3-6 in 2011 Data Summary Report for vegetation results that include the validation qualifiers.

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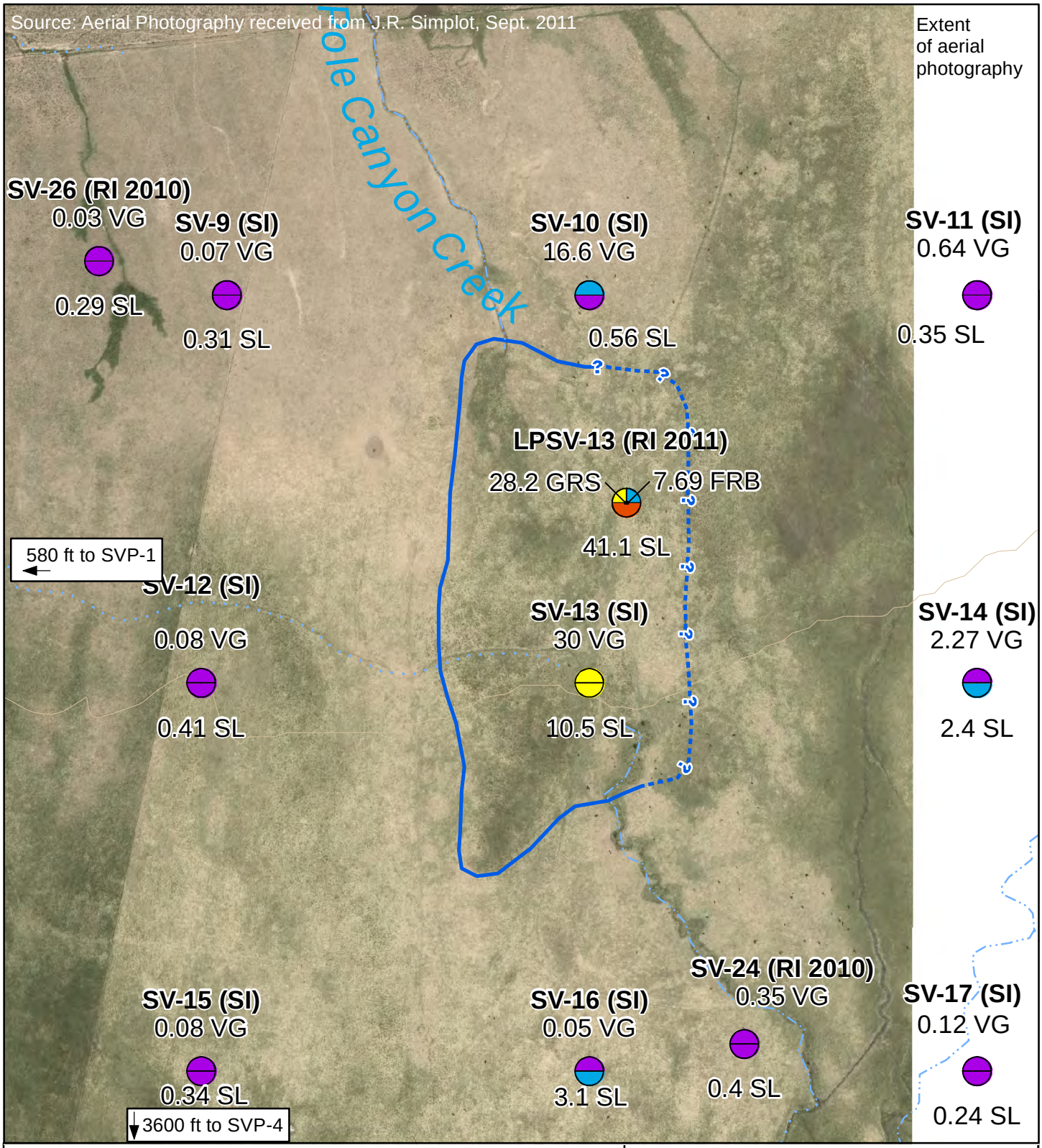
FIGURE 1
SELENIUM CONCENTRATIONS IN SOIL AND VEGETATION IN LOWER POLE CANYON CREEK AND NORTHERN SAGE VALLEY AND DATA COLLECTION LOCATIONS FOR GROUNDWATER AND SURFACE WATER

DATE: NOV. 05, 2012
BY: CRL FOR: FLC

FORMATION ENVIRONMENTAL



Legend

Occasionally Wet Area

Estimated Boundary

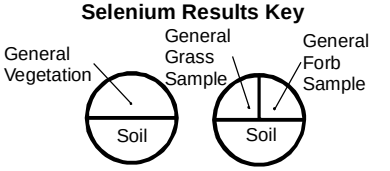
Selenium Concentration (mg/Kg) in Vegetation

- < 5 — AWRMP Removal Action Level for Plants
- 5 - 25
- 26 - 50
- > 51

Selenium Concentration (mg/Kg) in Soil

- < 0.63 — Ecological Screening Benchmark
- 0.63 - 5.20 — AWRMP Removal Action Level for Riparian/Fluvial Soils
- 5.21 - 39.0 — Human Health Screening Benchmark
- > 39.0

Selenium Results Key



N

0 175 350

Feet

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FIGURE 2

OCCASIONALLY WET AREA IN NORTHERN SAGE VALLEY

DATE: NOV 05, 2012

BY: CRL | FOR: FLC

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S:\GIS\arcprj\2010109\plt\Task44\SAP_Addendum04\Fig2_Sage Valley_WetArea.mxd

S:\GIS\ARCPRJ2\010109\PLT\TASK44\SAP_ADDENDUM04\FIG3_SAGE VALLEY_DETAIL.MXD

LPSV-03 (2011)
LPSV-11 (2011)
LPT5 (RI 2011)
SV-28 (RI)
6800
SV-1A (SI)
SV-2 (SI)
LPT6
SV-3 (SI)
LPSV-09 (2011)
SV-29 (RI)
SV-30 (RI)
6800
LPT7
SV-4 (SI)
SV-5 (SI)
LPSV-12 (2011)
SV-6 (SI)
SV-7 (SI)
GW-22 (existing well)
Pole Canyon Creek
SV-31
SV-26 (RI)
SV-8 (SI)
SV-9 (SI)
SV-10 (SI)
SV-11 (SI)
LPT8U
SV-32
LPSV-10 (2011)
SV-25 (RI)
SV-33
SV-34
SV-35
SV-36
LPSV-13 (2011)
MP01
SV-37
MP02
SV-12 (SI)
SV-13 (SI)
SV-40
SV-14 (SI)
SV-38
SV-39
MP03
SV-41
SV-42
SV-43
LPT8D
SV-44
SV-24 (RI)
SV-15 (SI)
SV-16 (SI)
SV-17 (SI)
LPT9
SV-23 (RI)
North Fork Sage Creek
Ditch
SV-22 (RI)

New Sample Locations

Shallow GroundWater
MP01
MP02
MP03

Sediment
LPT6
LPT7
LPT8D
LPT8U
LPT9

Soil
SV-31
SV-32
SV-33
SV-34
SV-35
SV-36
SV-37
SV-38
SV-39
SV-40
SV-41
SV-42
SV-43
SV-44

0 450 900
Feet
N

Legend
- PreviousSediment Sampling Location
- Previous Soil Sampling Location
- Previous Shallow Groundwater Sampling Location
- New 2012 Sediment Sample Location
- New 2012 Soil Sampling Location
- New 2012 Shallow Groundwater Sampling Location
- Occasionally Wet Area
- Estimated Boundary

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SAMPLING AND ANALYSIS PLAN ADDENDUM 04

FIGURE 3

FALL 2012 SAMPLE COLLECTION LOCATIONS FOR SHALLOW GROUNDWATER, SEDIMENT, AND SOIL IN NORTHERN SAGE VALLEY

DATE: NOV 05, 2012
BY: CRL
FOR: FLC

FORMATION ENVIRONMENTAL

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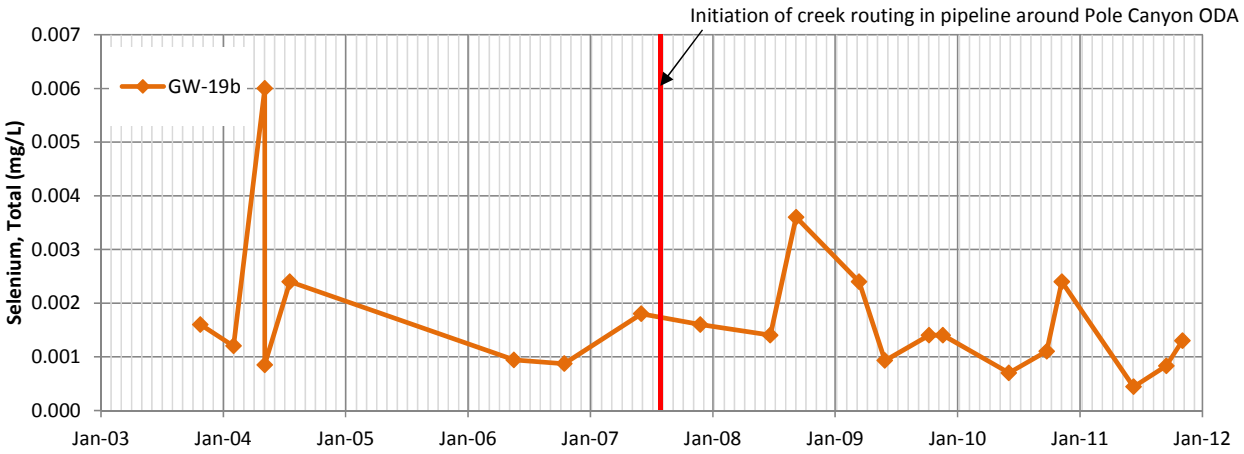

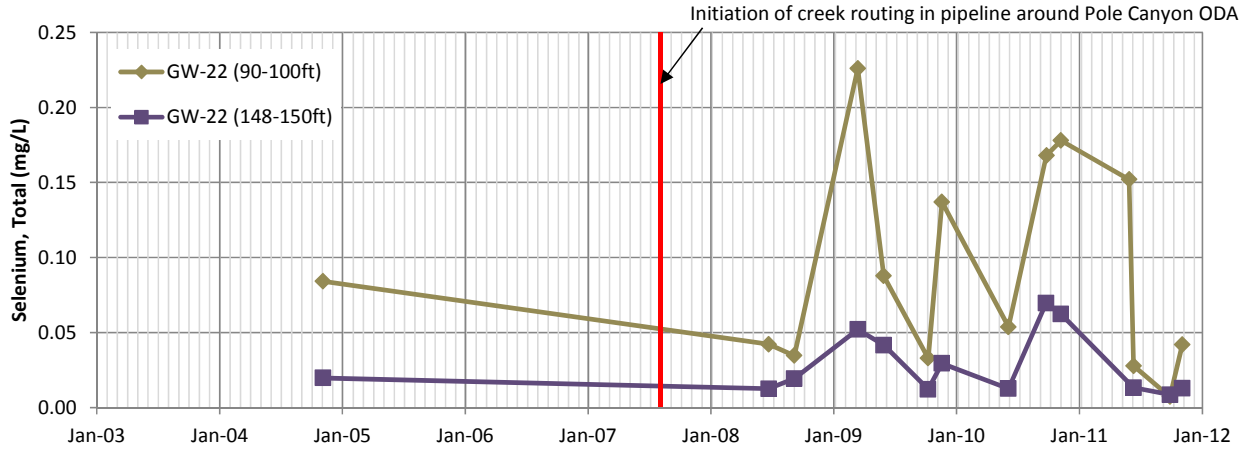

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Note: The selenium results for GW-19b are two orders-of-magnitude lower than results for GW-22.

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FIGURE 4

SELENIUM CONCENTRATIONS IN ALLUVIAL GROUNDWATER IN SAGE VALLEY: LONG-TERM TRENDS

DATE: SEPT. 19, 2012

BY: BAP | FOR: FLC

FORMATION ENVIRONMENTAL